REMARKS

Claims 1, 4-12, and 17-19 are pending in this application. Claims 13-16 have been canceled.

Applicant has amended independent claims 1, 8, 17, 18, and 19 to clarify that the electrolyte film is fixed to a carbon separator with an adhesive. Claims 5 and 10 have been amended to clarify that the electrolyte film is bonded to a pair of carbon separators. Finally, claims 13-16 have been canceled. Support for the amendments to the claims can be found on page 14 of Applicant's originally filed specification.

Claims 8-16, 18, and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over JP 7-249417 in view of U.S. Patent No. 5,284,718 to Chow et al. and U.S. Patent No. 6,044,842 to Pereira et al. Claims 1, 4-7, and 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over JP 7-249417 in view of Chow et al. and Pereira et al. as applied to claims 8-16, 18 and 19 above, and further in view of U.S. Patent No. 4,804,451 to Palmer.

Applicant traverses the pending rejections for the following reasons.

Claims 8-12, 18, And 19 Are Allowable Over The Combination Of JP 7-249417, Chow et al. And Pereira et al.

JP 7-249417, the primary reference, discloses a technique for bonding an electrolyte layer 30 and a frame 100 together with adhesives 410 (see paragraphs [0022], [0025], etc.). In contrast, the present invention as recited in claim 8, includes a method of manufacturing a fuel cell by fixing a polymer electrolyte film to a carbon separator. Claims 18 and 19 recite a fuel cell including a polymer electrolyte film and a carbon separator. Applicant submits that there is absolutely no teaching or suggestion of this method or fuel cell configuration in JP 7-249417.

Nor does JP 7-249417 teach or suggest an adhesive having a modulus of elasticity of not greater than 10 MPa after cure or a durometer A hardness of not greater than 90 after cure.

To correct the missing adhesive properties, Chow et al. and Perira et al. are cited by the Examiner. Specifically, Chow et al. is cited as teaching the need for resilient sealing materials and Perira et al. is cited as teaching a resilient material and the relationship between elastic modulus and durometer A hardness. The Examiner then indicates that the invention as a whole would have been obvious to one of ordinary skill in the art in view of the three references.

Applicant disagrees. As none of the references teach or suggest a polymer electrolyte film being fixed to a carbon separator, there is no reason why one of ordinary skill in the art would have combined the cited references to achieve the claimed method.

In addition, Applicant submits that the Examiner used improper hindsight to identify and combine the cited references. One of ordinary skill in the art would not have been motivated to combine the very specific identified teachings in the secondary references to achieve an adhesive with the claimed properties without first reviewing Applicant's own specification. For example, even if each of the secondary references teaches what the Examiner alleges, there is no suggestion or motivation within the references as to why one of ordinary skill in the art would combine the teaching of a fuel cell assembly with that of a gasketless connecting adapter to achieve the claimed adhesive.

Therefore, Applicant submits that claims 8-12 and 18-19 are allowable over the cited prior art.

Claims 1, 4-7, And 17 Are Allowable Over The Combination Of JP 7-249417, Chow et al., Pereira et al., And Palmer

Claim 1 recites a method of manufacturing a fuel cell by fixing a polymer electrolyte film to a carbon separator. Claim 17 provides a fuel cell including a carbon separator. As discussed above JP 7-249417 does not teach or suggest a carbon separator. Nor do Chow et al. and Pereira et al. correct the deficiencies of JP 7-249417. However, the Examiner further cites Palmer as teaching that when membranes are bonded to frames with an adhesive, the bonds are weak because the membrane surfaces are wet.

Applicant submits that Palmer does not correct the problems with the other references.

Here again, even if Palmer teaches that adhesives are weak when membrane surfaces are wet, one of ordinary skill in the art would not have been motivated to combine or modify the other references to achieve Applicant's claimed method and fuel cell without reviewing Applicant's application. For example, Palmer is directed to electodialysis not fuel cells and there is no suggestion in any of the references that the teachings of one could or should be used with another, let alone to specifically form the claimed fuel cell.

Therefore, Applicant submits that claims 1, 4-7, and 17 are allowable over the cited prior art.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the presently pending claims are in condition for allowance and issuance of a Notice of Allowance for claims 1, 4-13 and 15-19 is respectfully requested.

The Examiner is invited to contact the undersigned to discuss any matter concerning this application.

The Office is authorized to charge any underpayment or credit any overpayment to Kenyon & Kenyon Deposit Account No. 11-0600.

Respectfully submitted,

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Version With Markings to Show Changes Made

Please cancel claims 13-16.

1. (Twice amended) A method of manufacturing a fuel cell by fixing a polymer electrolyte film to a carbon separator [frame], said method comprising the steps of:

causing the polymer electrolyte film to have a water content of not greater than 4, which is expressed as a molar fraction of H_2O; and

bonding the polymer electrolyte film to the carbon separator [frame] with an adhesive having a modulus of elasticity of not greater than 10 MPa after cure.

5. (Once amended) A method in accordance with claim 1, wherein the step of bonding the polymer electrolyte film comprises providing [the frame being a pair of separators] a pair of carbon separators that are arranged across a pair of gas diffusion electrodes, between which the polymer electrolyte film is interposed.

8. (Once amended) A method of manufacturing a fuel cell by fixing a polymer electrolyte film to a carbon separator [frame], said method comprising the steps of:

providing an adhesive having a modulus of elasticity of not greater than 10 MPa after cure; and

bonding the polymer electrolyte film to the carbon separator [frame] with the adhesive.

10. (Once amended) A method in accordance with claim 8, wherein the step of bonding the polymer electrolyte film comprises providing [the frame being a pair of

separators] a pair of carbon separators that are arranged across a pair of gas diffusion electrodes, between which the polymer electrolyte film is interposed.

17. (Twice amended) A fuel cell, comprising:

a carbon separator [frame]; and

a polymer electrolyte film that has a water content of not greater than 4, which is expressed as a molar fraction of H_2O, and is bonded to the carbon separator [frame] with an adhesive having a modulus of elasticity of not greater than 10 MPa after cure.

18. (Once amended) A fuel cell, comprising:

a polymer electrolyte film;

a carbon separator [frame]; and

an adhesive that is used to bond the polymer electrolyte film to the carbon separator [frame] and has a modulus of elasticity of not greater than 10 MPa after cure.

19. (Once amended) A fuel cell, comprising:

a polymer electrolyte film;

a carbon separator [frame]; and

an adhesive that is used to bond the polymer electrolyte film to the carbon separator [frame] and has a durometer A hardness of not greater than 90 after cure.